Yangon University of Economics

Post Graduate Diploma in Research Studies

Second Quarter, Quarter End Test, December 2023

PGDRS (9th) Batch **Module Code: PGDRS 212**

Answer **ALL** questions. **Module Name: Quantitative Research Methods**

Time Allowed: (3) Hours

1.(a) What information is necessary to calculate a confidence interval?

(b) A random survey of enrollment at 35 community colleges across the United States yielded the following figures: 6,414; 1,550; 2,109; 9,350; 21,828; 4,300; 5,944; 5,722; 2,825; 2,044; 5,481; 5,200; 5,853; 2,750; 10,012; 6,357; 27,000; 9,414; 7,681; 3,200; 17,500; 9,200; 7,380; 18,314; 6,557; 13,713; 17,768; 7,493; 2,771; 2,861; 1,263; 7,285; 28,165; 5,080; 11,622. Assume the underlying population is normal.

i. Define the random variables X and X Bar in words.

ii. Which distribution should you use for this problem? Explain your choice.

iii. Construct a 95% confidence interval for the population mean enrollment at community colleges in the United States.

2.(a) What is the disadvantage of sample size determination for finding a confidence interval for a proportion?

(b) One university has 1000 students in each of the four classes. The percentages of the Freshman–Sophomore, Junior, and Senior classes expressing interest in professional training after graduation were guessed to be 20, 50, and 80%, respectively. (a) For each of these three groups, find the sample sizes required to estimate the percentage if the estimate should not differ from the actual value by not more than 20% of the actual value except for $\alpha=0.05$, and present the reason for the differences in the sample sizes. (b) Find the sample sizes needed for each of the three groups for estimating the above percentage if the error of estimation should not exceed 10% except for $\alpha=0.05$ and present the reason for the differences in the sample sizes.

3. (a.) What is the difference between a one-sample t test and a dependent samples t test. How are they alike?

(b) What is the null hypothesis for a dependent samples t-test in words and symbols?

(c) Ten subjects take a test of motor coordination, once after drinking a pint of beer and once without drinking alcohol. Their times in seconds to complete the task were:

Subject	1	2	3	4	5	6	7	8	9	10
With beer	12.4	15.5	17.9	9.7	19.6	16.5	15.1	16.3	13.3	11.6
Without beer	10.0	14.2	18.0	10.1	14.2	12.1	15.1	12.4	12.7	13.1

Perform a matched-pairs (also known as a dependent-means) t-test to test whether drinking beer makes you slower at the task.

P.T.O/2

4.(a) Two different cereal companies make a raisin bran cereal. Twelve different 18-ounce boxes are randomly selected for each brand and the contents weighed. Brand A has a mean of 18.05 oz and a standard deviation of 0.20 oz. Brand B has a mean of 17.98 oz and a standard deviation of 0.24 oz. Is there a significant difference in the variances or in the weights of the two brands? Interpret your results.

(b) In an experiment on the effect of a growth regulator on fruit setting in muskmelon the following results were obtained. Test whether the fruit setting in muskmelon and the application of growth regulator are independent at 1% level.

	Fruit Set	Fruit not set	Total
Treated	16	9	25
Control	4	21	25
Total	20	30	50

5.(a) When there is no significant difference among three or more means, the value of F will be close to what number?

(b) A study examining differences in life satisfaction between young adult, middle adult, and older adult men and women was conducted. Each individual who participated in the study completed a life satisfaction questionnaire. A high score on the test indicates a higher level of life satisfaction. Test scores are recorded below.

Group	Young Adult	Middle Adult	Old Adult
Male	4	7	10
	2	5	7
	3	7	9
	4	5	8
	2	6	11
Female	7	8	10
	4	10	9
	3	7	12
	6	7	11
	5	8	13

a.Complete the following ANOVA table.

Source	**SS**	**df**	**MS**	**F**
Age	180	2		
Gender	30	1		
Age x Gender	0	2		
Within	44	24		
Total				

b. Are there any significant main effects or an interaction effect. Interpret your results.

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